RHODE ISLAND COLLEGE

FEINSTEIN SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
NCATE ACCREDITATION

INFORMATION TECHNOLOGY AND INFRASTRUCTURE[1]

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INFORMATION INFRASTRUCTURE

At the conclusion of the 2001 self-study, PeopleSoft, RIC's ERP system and the LMS , WebCT, were new installations; wireless access points and smart classrooms were campus rarities. In the aftermath of unprecedented state funding for infrastructure renovation and expansion in the late 90's, the College laid down a solid foundation for the explosion in campus technology it experienced during the first decade of the 21st century. Continuously fueled by the momentum of technological advance enabled by a solid and reliable infrastructure, information resources became widely accessible, easier to use, more flexible, and intentionally expandable. The campus network, the College web site, and the email and ERP systems have an uptime percentage greater than 99% and offer a stable platform for academic and administrative functions. Our current information systems cross traditional boundaries separating administrative and academic schools and departments to strengthen collaborative bonds among students, scholars, and colleagues within the institution and beyond.

After a reorganization of Information Services late in 2001, the current central Information Technology structure emerged. Currently, Information Services is divided into four units: Institutional Research, Management Information Services, Network and Telecommunications, and User Support Services. Staffing has remained flat over the last decade while responsibilities and budgets have grown (see staffing and budgets chart for details - suggest line chart).

INSTITUTIONAL RESEARCH

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[1] Drafts of the NEASC institutional report were extensively used to generate this document. We thank Heidi Ben Aicha, Richard Prull, Pat Hays, and in Yin for providing this information.

The Office of Institutional Research and Planning (OIRP) is the smallest of the four divisions. OIRP staff provide institutional data for administration, assessment, and planning and oversee formal and informal data warehousing and institutional reporting.

MANAGEMENT INFORMATION SERVICES

Management Information Services is responsible for providing technical support for all administrative functions at Rhode Island College. The major administrative computer systems of the College supported by the MIS staff are Student Administration, Human Resources, and Financials. These modules are part of the PeopleSoft enterprise software suite for colleges and universities. Students register, check grades, and view financial aid information online. Faculty submit grades, view rosters, and perform other administrative tasks using web-based self-service. Additional database support in areas not currently served by PeopleSoft is also provided to administrative departments as well as scanning services for timesheets and testing.

RIC's current information system is positioned as one of the key components of the college's overall strategic plan to provide global access to timely and accurate administrative information for faculty, students, and administrators. The MIS 5-year plan calls for keeping administrative systems up-to-date and maintaining a rigorous upgrade schedule. MIS will keep up with current technology through state-of-the-art system design, application development, and the utilization of project management tools and techniques.

NETWORK AND TELECOMMUNICATIONS

Rhode Island College's data network infrastructure exists out of a 2-node virtual core switch with a 20Gbps connection between the nodes. The virtual core provides redundancy and failover capabilities, including a redundant firewall. All building data networks feed back to the core over a 1Gbps connection. The wired data network infrastructure is expanded with 802.11n wireless access that covers all academic buildings and the campus mall. The wired client devices (PC's, Macs, printers, VoIP phones and so on) are nearly all connected with a 100Mbps link; in computer labs that require more capacity the clients are connected with a 1Gbps link. Internet (and Internet-2) is provided via OSHEAN with adequate capacity (scalable on an 'as needed' basis), presently averaging at 40Mbps. The server infrastructure is nearly 90% virtualized (150 virtualized servers) using 30 VMWare ESX 4 hosts.

Infrastructure development is based on academic/business needs and business continuity as defined by the College's strategic plan. Future plans include upgrading wired access speed to 1Gbps where needed, providing ubiquitous wireless access on campus, increasing access point density, and upgrading building-to-core links to 10Gbps where needed. Additionally implementing redundancy of building data networks by dual-homing these to the core. To further reduce the risk of extended outages in the data network and server infrastructure additional redundancy will be implemented by leveraging the existing virtualization technologies. Each building data network will have multiple connections to the core of the network, while the main data center will have secondary locations allowing us to move servers quickly if availability challenges occur in the date center.

USER SUPPORT SERVICES

User Support Services is responsible for distributing and maintaining desktop hardware, software, and classroom multimedia resources. Charged with assisting students, faculty, and staff in the appropriate use of technology, USS provides a primary point of contact for end-user support, and offers a wide range of services including help desk, audiovisual distribution, computer lab and electronic classroom management, and technology training. The current organization of USS was achieved in 2007, when User Support Services merged with Audio- Visual (AV) Services. The merger was made possible through administrative support and staff commitment to improving

services through cross-training and professional development. Since the merger, USS occupies two physical locations, the former AV office, now the Gaige Hall Help Center and the Horace Mann Technology Center, the home of Instructional Technology and Training.   ITT oversee campus computers labs, site-licensed and academic software, faculty and staff training, and manage Blackboard, the Learning Management System.

INFORMATION TECHNOLOGY SERVICES

The Information Services Help Center supports about 1,400 college-owned computers, a wide variety of printers, scanners, and multimedia devices. The full-time staff of the Help Center actively mentor a large student staff, many of whom master high level skills that allow them to obtain IT jobs after graduation. The Help Center responds to routine help desk work orders for hardware and software assistance, operates an equipment loan desk for faculty, staff, and students, and supports classroom technologies and special events during standard and extended hours including evenings and weekends. To facilitate the tracking of work orders, an enterprise help desk ticketing system , Numara, Track-it was implemented by USS in 2004. Facilities and Operations adopted Track-it a year later. A campus-wide event management system, EMS, was installed in December of 2009. Integrating audiovisual services into EMS was a requirement for a successful campus-wide implementation so Help Center staff swiftly transitioned from an outdated system of paper forms and local databases to a fully automated system, an outstanding accomplishment that has already resulted in increased efficiencies.

There are approximately 550 desktop computers (Windows and Mac OS) located in 20 campus computer labs. Ten labs are centrally managed by User Support Services, and nine are departmental labs with all hardware and software support provided by USS. A small Assistive Technology Lab jointly supported by USS, the Office of Student Life, and the Library is located in Adams Library. The walk-in computer labs in Horace Mann and Whipple halls are extremely popular with students (can cite usage stats) and serve as highly visible indications of the institutional commitment to its mission to make a quality higher education accessible to traditional and non-traditional students.   These facilities are open seven days a week and are staffed by trained student monitors for a combined total of 161 hours weekly. Lab monitors answer in-person and telephone questions from students about user accounts, administrative computing services, email, and the Learning Management System. The larger of the two walk-in labs is the Horace Mann Technology Center (HMTC) a 100-seat facility open five nights a week until midnight.

After obtaining institutional financing for remodeling in 2009, USS created student learning spaces for collaborative stud. At present, the HMTC has four distinct student work areas and a faculty development area. Both campus walk-in labs contain small cubicles where students may reserve Apple Mac Pro workstations for graphic design and video editing projects. Students may also borrow laptops and projectors for use in the labs. Hardware in the walk-in and instructional labs is refreshed on a two-year cycle to ensure that student workstations are up-to-date and eligible for warranty repairs. Although recent surveys of entering freshmen show that 97% of the entering students have computers, they do not have comparable access to specialized software applications required for class assignments. Student software needs are met by a Microsoft Campus Agreement that provides MS Office, Visual Studio and other MS products to all RIC students. An extensive offering of site-licensed and specialized academic application software purchased by the College to meet academic needs is readily available in walk-in labs.

In addition to the instructional labs, several classrooms contain mobile computer carts, five Tablet PC carts and two Apple laptop carts are in active service. The majority of classrooms on campus have been enhanced with technology and multimedia equipment. Several classrooms contain mobile computer carts, and five Tablet PC carts and two Apple laptop carts are in service. In fall 2010, 72% of RIC classrooms were equipped with computers, multimedia projectors, DVD players, and

audio speakers. As of the start of the spring semester 2011, 106 of the 118 rooms designated as generalpurpose classroom or seminar rooms have been electronically equipped (90%). Through the auspices of the state funding for STEM (Science, Technology, Engineering and Mathematics), state-of-the-art smart classrooms were created in five campus buildings during a large-scale renovation project.

The generous funding for STEM education from the State of RI to RIC recognized and enhanced the College's role as a leader in K-12 education in New England and the institutional mission to support prospective and in-service educators.   In support of the state-wide initiative for excellence in STEM education, the College houses the Center for STEM Education, which is located in the second floor of the Henry Barnard Laboratory School. Funding for the technology incorporated within four Henry Barnard STEM classrooms exceeded $500,000. A fifth classroom was added at college expense in the fall of 2009. Additionally, eight classrooms and two auditoria financed with State STEM funds will open to students in the fall of 2010.

STEM classroom design incorporates established and emerging instructional technologies for the purpose of stimulating the creative use of technology by K-12 environments. While today's STEM classrooms offer lecture capture, video conferencing, document cameras, wireless networking, and a variety of annotation devices and application software for math and science research, their flexible design will permit modification in the years to come.

In keeping with the strategic plan, the College is committed to alternative methods of delivering traditional and continuing education. Online learning is a major component of that initiative. Beginning in the Fall Semester of 2009, RIC began a transition from WebCT 4.1 to a hosted Blackboard 9 environment and met its goal to retire WebCT completely in July of 2010. Presently, Information Services staff are seeking more robust methods of incorporate synchronous communication for distance learning. Faculty use of the LMS system has dramatically increased over the five years on the self-study. However, adoption of the LMS is unevenly distributed across schools and departments – show chart. With the replacement of WebCT by Blackboard, ITT staff stepped up faculty training efforts to facilitate rapid adoption of the new LMS. In keeping with the College's strategic plan to develop alternative modes for instruction, including distance learning, the staff developed two online training classes for faculty and student Blackboard users. Face-to-face training is still the most widely accepted format for faculty and staff to update their technology skills. Over 50 Blackboard training sessions were offered in 2009 and 2010.   Staff also taught workshops in other software applications including MS Office, Acrobat Professional, Camtasia Studio and Audacity.

COMPUTERS, NETWORKS, LABS, CLASSROOMS

The college has invested heavily in e-facilities and network infrastructure, including wireless access technology, across campus.

As of spring 2010, 70% of the college's classrooms and lecture halls had been converted to e-classrooms, all with basic presentation technology. Six STEM classrooms in Henry Barnard School building are state-of-the-art e-classrooms with video conferencing and capture. In summer 2010, 12 additional new state-of-the- art STEM classrooms were constructed, including three large lecture halls in Clarke Science and Fogarty Life Science, and 18 additional classrooms were converted to e-classrooms. By the end of FY11, about 90% of the classrooms will be e-classrooms (the remaining classrooms await further infrastructure improvements to address humidity/water problems and other issues).

Information about e-classrooms can be found on the Faculty Toolbox on the college website, http://www.ric.edu/uss/eClassroomlogin.php (password 'hershey'). This information includes documentation of the type of computer and presentation equipment in each room as well as video-based instructions for its use. In addition, the college has two large walk-in computer labs and 15 teaching labs.

In 2009-2010, the college implemented the Dean Evans and Associates Event Management System (EMS) for scheduling and reservation of all classrooms, laboratories, and public spaces. Both internal and external community members can request the usage of space, with standard fees set according to a new institutional policy. Classroom usage is scheduled in PeopleSoft and downloaded to the EMS system. The online calendar on the RIC website (https://ricalendar.ric.edu/MasterCalendar/MasterCalendar.aspx) pulls data from EMS to display all events at the college. The EMS system has regularized the college's approach to facility usage, improved its ability to analyze space utilization, and normalized the fees for usage of campus facilities and associated services.

The college has recently upgraded the data network infrastructure to a 10 Gbps backbone with a gigabit connection from each building into the core. The college obtains its Internet service through a non-profit consortium (OSHEAN), which delivers a 30 Mbps (burstable to 45 Mbps) bandwidth to Internet-1 as well as 45 Mpbs Internet-2 connectivity.

Since 2000 the college has significantly upgraded its data center by:

- Adding a second power generator to provide full power redundancy for equipment and HVAC
- Installing a new HVAC system with redundant (n+1) capacity
- Making extensive use of server/storage virtualization to decrease cost and maintenance and increase availability

Wireless network/Internet access is widely available across campus, the major classroom building exceptions being Craig-Lee (partial), Whipple (partial), and the Art Center. By December 2010, wireless access will be extended to all classrooms. The residence halls have 100% wired and wireless Internet connectivity.

The college's administrative computing is based on PeopleSoft's Financial and Human Resource/Student Administration systems, Event Management System, and the Adirondack Housing System. All versions are current and have, in some cases, been customized to accommodate the college's specific business requirements. Usage of PeopleSoft features has been expanded as paper-based business processes have been replaced by electronic processes. For example, in 2010 all of the paper forms for initiating payment of adjunct faculty and full-time faculty on overload teaching were replaced by electronic processes, eliminating some 800 carbon-copy signature routings each semester. Similarly, assignment of courses to faculty by department chairs became electronic.

IT staffing has remained stable for the past ten years:

Table 8.3: IT Staffing

Department	FY2001	FY2010
Network & Telecommunications	8	9
Management Information Services	12	12
User Support Services (including AV)	18	15
Director/Executive	3	4
TOTAL	41	41

The following is a summary of the major IT changes since 2000:

- Upgraded data center with backup power and HVAC systems
- Virtualized 75% of data center servers
- Maintained network and critical application services with a goal of no non-scheduled down time
- Created second path for future redundant network path off campus
- Improved emergency telephone and security camera infrastructure
- Upgraded phone system to Nortel Meridian PBX

- Major upgrade to core network infrastructure to improve performance and increase redundancy
- Expanded wireless network connectivity (g and n protocols) to most of campus
- Implemented Microsoft SharePoint for collaborative work
- Maintained version changes with Microsoft Exchange e-mail environment
- Completed implementation of PeopleSoft Financial and Human Resource/Student Administration systems
- Migrated PeopleSoft from a client/server to a web-based environment
- Updated PeopleSoft systems with version changes on a regular basis
- Customized PeopleSoft to accommodate business process needs
- Implemented housing, applicant tracking, and facilities-reservation systems
- Increased e-classrooms to 72% of total – 90% target for end of FY11
- Created 16 state-of-the art STEM e-classrooms/lecture halls
- Migrated to new learning management system – WebCT 4.1 to Blackboard 9.0
- Merged audiovisual service into User Support Services for coordinated classroom support
- Combined Help Desk and AV distribution into one physical location
- Configured Track-it system as a combined work order system for IT and Facilities and Operations

POLICIES FOR ENSURING DATA SECURITY, INTEGRITY, AND PRIVACY

The college recognizes the importance of maintaining a reliable information infrastructure, the foundation of which is the 4-year average equipment replacement cycle and needs-based scaling of the infrastructure. Older equipment is replaced before it can become a reliability risk, and new equipment is added to meet increased capacity needs. The infrastructure is constantly monitored to determine the need to take corrective action to sustain a high level of reliability. This process has led to far reaching virtualization of the information infrastructure: 90% of all servers and storage is virtualized, and, in the core of the data network infrastructure, the college has implemented a virtual switch/router/firewall. Virtualization adds an extra layer of redundancy that is further strengthened by a procedure that ensures the backup of all critical virtual servers to allow immediate restoration and relocation to improve business continuity. In addition, limited multi-location redundancy in Gaige and Henry Barnard School has been implemented, creating the possibility of transparently moving servers between multiple locations in real-time.

Access by users to IT services is managed at three levels: data infrastructure, server infrastructure, and application. At the data infrastructure level, the ability to connect to servers is restricted; for example Internet-facing applications are only exposed to SSL-encrypted web interfaces, and the number of such applications is limited. The same control for application access from the Internet is applied to the wireless network. To access other on-campus systems and data wirelessly, additional authentication is required as is used for the internal network. Access to servers is restricted to server administrators and application administrators. Access to applications is managed by the application administrators and is role-based. Application and server access is recorded in audit logs.

All servers and PC's run a centrally managed and monitored anti-malware application to prevent limited or widespread compromise of systems that could result in "data leakage." The servers run a different anti-malware application from the client computers to add containment capability. All data traffic to and from the Internet is monitored to identify any malware communication, and any on-campus systems that are possible malware communications are audited and cleaned. Additional layers of malware protection are implemented in the e-mail system to prevent any large scale malware or phishing attacks.

Critical data and applications such as the e-mail system are backed up multiple times per day and/or are replicated to a secondary (on-campus) location. Other technologies like snapshotting are used to further reduce the risk of data loss.

Updates and upgrades to major applications such as the PeopleSoft enterprise system, the Blackboard learning management system, and the Microsoft Exchange e-mail/calendaring system are handled via individual application lifecycle management processes that ensure application stability and limit the risk of data corruption and/or loss. Regular – in most cases daily – data backups are done to allow for the restoration of corrupt or lost data. To avoid extended outages while data are restored, all backups are made to disk for rapid restoration and, if necessary, later archived to tape.

EVALUATION OF TECHNOLOGY

Equipment replacement is currently adequate, but as the scope of technology in classrooms has increased, the cost of periodic upgrades has increased nearly proportionally. Desktops and servers are generally on a three/four year replacement cycle, with classroom AV equipment being replaced as required. Network and telephone system upgrades have been made on a continuing basis, and a redundant off-campus internet/telephone path is expected in the coming year. E-facility and wireless access expansion is nearing completion.

As the college moves intentionally into online learning, a greater proportion of its core functions of teaching and learning require technology. Because teaching online changes classroom instruction practices, there is a rising demand for ubiquitous access to online resources and systems. In addition, there are two other factors that are putting increased pressure on college IT support. One is that an increasing number of resources desired by the college community are not college managed resources, but those users acquire on their own from external vendors but expect support for (e.g., mobile communication devices, web-based applications); this increases the integration of systems that make the user experience more "seamless" but requires a concomitant increase in IT coordination and sophistication to maintain them on the back end. Although the college works hard to keep up with these demands, needs generally outstrip capacity.

APPRAISAL

Clearly the College has made incredible strides over the last decade. In the search for new ideas and effective practices, faculty and administrators have benefited from ready access to internet resources and comparative data from other institutions. Information Services relies on external as well as internal sources for innovative solutions to old problems and new directions for the future. Our network infrastructure is robust and availability statistics for enterprise systems are exceptionally high. The renovation of classroom spaces to include technology for teaching and learning has been fast-paced and exceeded that many peer institutions.

The College is an active member of EDUCAUSE, NERCOMP, OSHEAN and HUEG. Through attending and contributing to HUEG conferences, MIS and administrative staff are able to share ideas with PeopleSoft users at other institutions. While the College weaves technology planning into its strategic planning processes, departmental planning within IS also influences the direction of IT. Operational forecasts cover 3-5 year horizons for projecting budgets, hardware and software upgrades, staffing, and organizational changes. Information Services has successfully met all strategic planning milestones in set forth in Plan 2010 as well as internal planning goals.

However, change is often unanticipated and rapid responses to immediate institutional needs or to direct input from students, faculty, and staff is appropriate and is encouraged by IT leadership. Information Services welcomes suggestions for improvement from the College community. Three campus user groups have been formed to provide guidance to Information Services. They are ATAC, the Academic Technology Committee of the Rhode College Council; the DTLs, a committee of faculty representatives from all academic departments; and a committee of administrative PeopleSoft users. Student input comes from many sources including the large student staff of User Support Services, student organizations and the Presidents Idea Box on the home page of RIC's web site.

\Policies and procedures for Information Services are a work in progress. The Rhode Island College policy for Responsible Computing was drafted many years ago but remains viable. Copyright education is an obvious institutional concern. Although copyright policy is explained at New Student Orientation and reinforced on the web site of Apogee, the College's residential student network service provider, the law is constantly changing and reeducation is necessary. Adams Library and User Support Services lead institutional efforts to inform the RIC community of issues related to fair use and copyright compliance. Our Blackboard LMS includes SafeAssign, a tool for teaching students to recognize and value original intellectual property. The Rhode Island Board of Governors for Higher Education sponsors a periodic audit of the three state institutions to ensure compliancy in software licensing.

Information Services has not systematically collected formal satisfaction surveys. One exception is ITT training classes where evaluations are distributed at the conclusion of every course. All workshops received high marks, and faculty and staff frequently send email to IT administrators praising training courses and help desk services. The Help Center plans to follow-up closed work orders with a satisfaction survey beginning in the fall of 2010.

An important development for delivery of information resources has been the growth of social networking. Administrative offices recognize the importance of social networking sites as a vehicle for communicating with students. Enthusiastic faculty capture lectures, hold webinars and post videos to the web. With a smorgasbord of free Internet tools for communicating and distributing content for higher education today and Information Services established commitment to good customer service, staff have difficulty setting realistic boundaries for support.

Academic programs rely heavily upon the IT infrastructure and support staff to facilitate to teaching and learning. Core competency testing such as Accuplacer and professional assessment tests such as HESI in the School of Nursing require secure and available computing resources. Finding appropriate testing venues for computerized exams is sometimes a challenge during periods of peak usage. The purchase of assessment applications such as Chalk and Wire by the School of Education offer great promise and integrate well with existing IT systems although seamless integration will require time and technical expertise. We are hopeful that resources within Information Services will be sufficient to meet institutional demands. Accordingly, prioritizing future projects will become significantly harder. Faced with an ubiquitous demand for skilled technical assistance, IT staff are finding little time for professional development. Although the College has purchased Element K online training for full-time and student staff, and provided attractive opportunities for participation in NERCOMP, OSHEAN and vendor-sponsored training events, some staff members do not allocate time for professional development. Without strong incentives to master new technologies, not all staff members maintain up-to-date technical skills, and thus place the burden of heavier workloads their highly skilled colleagues. Although this problem is not unique to IT, the information architecture of colleges and universities has traditionally served as a source of inspiration for innovation in higher education. As we prepare to meet the challenges of educating a new tech-savvy generation with high expectations for information on demand, training and nurturing talented support staff who will assist the institution in fulfilling its mission to deliver quality education to traditional and non-traditional students must be a top priority for Information Services.

PROJECTION

Academic programs will rely more heavily on information resources to support their objectives as technology plays an increasingly significant role in preparing students for higher education, addressing developmental needs, testing core competencies, assessing student outcomes, and satisfying a growing market for continuing education.

Information Services will continue to provide a robust and efficient infrastructure to guarantee the high availability and security of information resources.

Collaboration and federation among service providers inside and outside the higher education community will extend current college resources in both predictable and unforeseen ways.

Acquiring alternative mechanisms for delivering information services through the Internet cloud has become a familiar solution for institutions confronting the dilemma of how to meet budgetary restrictions while making global information resources accessible to higher education communities across barriers time and space.   For Rhode Island College, and for higher education in general, email outsourcing offers the promise of making previously unthinkable data storage capabilities coupled with easy access to collaboration tools. However, RIC and other institutions must weigh the costs and benefits of outsourcing carefully before they approve solutions proposed by vendor partners who will benefit from adoption.   Opportunities to expand campus resources through information services are rapidly expanding, but a thoughtful selection and approval is necessary.

The RIC community must share internal resources more efficiently to remain innovative and competitive in the face of budgetary restrictions. RIC should continue to embrace virtualization technologies which open new possibilities for application sharing and facilitate the greater availability of specialized software applications.

The College community is demanding better synchronous communication and is eager to espouse evolving applications requiring greater bandwidth.   Advanced streaming, telepresence, and other rapidly emerging technologies will soon be commonplace. Social computing and consumer technologies reflect the leading edge of innovation and higher education institutions must be prepared to meet the high expectations of faculty and students who have better technology at home than on campus.

Increasing demand for technology resources will ensure a high level of competition for information services so strategic planning and well-articulated institutional priorities will continue to drive, challenge and inspire IT leaders and professionals until the next self-study.